Application/Control Number: 09/996,081
Art Unit: 2655

Docket No.: 2000-0573

REMARKS

Reconsideration and allowance are respectfully requested. Claims 1 – 16 are pending and only claim 1 is amended. Applicants have amended claim 1 to overcome the Examiner's objection to the grammatical informality. This claim is not amended to narrow the scope of the claim or for patentability. Applicants request withdrawal of this objection to the claims.

The specification is amended by changing the title to be clearly indicative of the invention. Applicants request withdrawal of the objection to the title.

Rejection of Claims 1, 8 and 12 – 14 Under Section 102

The Examiner rejects claims 1, 8 and 8-14 under Section 102 as being unpatentable over U.S. Patent No. 5,864,810 to Digalakis et al. ("Digalakis et al."). Applicants traverse this rejection and submit that Digalakis et al. fail to teach each claim limitation.

We turn first to claim 1. The Examiner asserts that Digalakis et al. teach the step of concatenating the lattices into a single concatenated lattice with their cluster engine (feature 120 in FIG. 4) and creating a set of tied models in col. 6, lines 45 – 53. However, the clustering engine of Digalakis et al. does not concatenate lattices. Digalakis et al. discuss in col. 6, lines 45 – 63 what the clustering engine 120 does. This engine operates on the trained speaker independent (SI) language models and creates a set of tied models according to a particular method, which they incorporate by reference from another patent application. That method is set forth in Application No. 08/276,742, now Patent No. 5,825,978. While the Examiner equates the method disclosed in Digalakis et al. as the recited step of concatenating the lattices into a since concatenated lattice, these are clearly different processes. As stated by Digalakis et al., they use the method of creating a set of tied models as disclosed in the '978 patent. The summary of the method of that patent is as follows:

> In accordance with the invention, a speech recognizer is provided that uses a computationally-feasible method for constructing a set of Hidden Markov Models (HMMs) for speech recognition where the HMMs utilize a partial and optimal degree of mixture tying. With partially-tied HMMs, improved recognition accuracy over systems that use fully-tied HMM of a large vocabulary word corpus is achieved with less computational overhead than systems that use fully untied HMMs. The

> computationally-feasible technique comprises the steps of determining a cluster of HMM states that share Gaussian mixtures which are close together, developing a subset codebook for those clusters, and recalculating the Gaussians in the codebook to best represent the clustered states. Patent No. 5,825,978, Summary.

The only place in the '978 patent where lattices are mentioned is the first paragraph after the heading "EXPERIMENTAL RESULTS" wherein they state:

> The method according to the invention has been evaluated on the 5,000-word and 64,000-word recognition tasks of the Wall Street Journal (WSJ) corpus using SRI's DECIPHER.TM. speech recognition system and the progressive-search framework for fast experimentation. With this approach, an initial fast recognition pass creates word lattices for all sentences in the development set. These word lattices are used to constrain the search space in all subsequent experiments.

In sum, the "tied models" taught by Digalakis et al. are not the same thing as concatenating lattices into a single concatenated lattice. Their approach is to create HMMs that utilize a partial and optimal degree of mixture tying and thus improve recognition accuracy. They are tying together HMMS, not concatenating lattices. Therefore, this limitation is simply not taught by Digalakis et al.

Next, the Examiner equates applying at least one language model to the single concatenated lattice in order to determine a relationship between the lattices with column 13, lines 38 – 46 of Digalakis et al. Applicants traverse this comparison and submit that column 13 of Digalakis et al. merely teaches creating output word lattices from the speaker-independent recognizer with a bigram language model. The lattices are then rescored using speaker-adapted models. In this same paragraph of Digalakis et al., they discuss their speaker independent continuous HMM systems used as seed models for adaptation. There is no suggestion or teaching with regards to the lattices disclosed by Digalakis et al. that (1) there is a concatenated lattice; and (2) that a language model is applied to the concatenated lattice to determine relationships between the lattices used for concatenation. While Digalakis et al. mention several words used in claim 1, they simply fail to teach several of the recited limitations. Therefore, Applicants respectfully submit that Digalakis et al. do not teach each limitation of claim 1 thus rendering this claim patentable and in condition for allowance.

Similarly, independent claims 8 and 14 recite comparable limitations to those discussed above. Therefore, these claims are patentable as well over Digalakis et al. Claims 12 - 13 each depends from claim 8 and recites further limitations therefrom. Accordingly, since Digalakis et al. fail to teach each limitation of claim 8, Applicants submit that dependent claims 12 and 13 are patentable as well.

The Examiner also rejects claims 1, 8 and 13 - 14 as being anticipated by U.S. Patent No. 6,581,033 to Reynar et al. ("Reynar et al."). Applicants traverse this rejection and submit that Reynar et al. fail to teach each limitation of the claims.

We again first turn to claim 1. The Examiner asserts that at column 8, lines 1 - 17, that Reynar et al. teach the limitation of applying at least one language model to the single concatenated lattice in order to determine relationships between the lattices. Applicants respectfully submit that Reynar et al. do not teach this limitation. Specifically, Reynar et al. in this portion of their disclosure focus on the basic process of automatic speech recognition that produces text from speech. They reference the dictation processor 214 that receives the voice signal and returns text. They note that a statistical language model SLM or other language model may be used to return the text string. Their goal is to identify from that speech what kind of command would be input to an application program 138. The use a context-free grammar language model 220 in connection with a command processor 212 to return a command for the given speech. Other language models are taught as being available to process the speech input and produce a command. Notably, in this portion of Reynar et al., they never mention lattices or a concatenated lattice. While they talk about the application of language models, they only do so with reference to their dictation processor (automatic speech recognition) or their command processor.

While Reynar et al. later in column 8 do mention lattices as identified by the Examiner, they simply do not teach that a language model is applied to a single concatenated lattice in order to determine relationships between the lattices. For this reason, Applicants

respectfully submit that Reynar et al. fail to teach each limitation of claim 1 and that this claim is patentable and in condition for allowance.

Claim 8 recites a controller that concatenates the lattices into a single concatenated lattice and applies at least one language model to the single lattice. As discussed above, Reynar et al. fail to teach applying a language model to the single concatenated lattice. Therefore, Applicants submit that this claim is patentable. Furthermore, claim 14 recites a controller that includes a section that applies least one language model to the single concatenated lattice. Therefore, this claim is patentable as well.

Claim 13 depends from claim 8 and recites further limitations therefrom. Accordingly, Applicants submit that this claim is patentable.

Rejection of Claims 2 - 7, 9 - 11 and 15 - 16 Under Section 103

The Examiner rejects claims 2, 6-7, 9, 11 and 16 under Section 103 as being obvious in view of Digalakis et al. and U.S. Publication No. 2002/005272 to Thrasher et al. ("Thrasher et al."). Applicants traverse this rejection and submit that these claims are patentable for the following reasons.

First, these claims each depend from an allowable claim as set forth above where Applicants showed how Digalakis et al. fail to teach each limitation of claims 1, 8 and 14. Therefore, for this reason, Applicants submit that claims 2, 6 - 7, 9, 11 and 16 are patentable.

As a second reason, Applicants submit that there is no motivation or suggestion to combine these references. This shall become clear with the discussion below.

To establish a *prima facie* case of obviousness, the Examiner must meet three criteria. First, there must be some motivation or suggestion, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to combine the references. Second, there must be a reasonable expectation of success, and finally, the prior art references must teach or suggest all the claim limitations. The Examiner bears the initial burden of providing some suggestion of the desirability of doing what the inventor has done.

"To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." MPEP 2142.

When the entire teachings of the prior art are considered for their suggestive power with regards to combining with each other, they do not suggestion or provide motivation to blend their teachings. Digalakis et al. focuses on an adaptive method for improving speech recognition of a particular speaker. They explain that where different speakers have different accents and differences in their speech patterns, that what is needed is a system and method that can adapt quickly to a particular speaker using a small amount of adaptation data. Col. 2, lines 47 - 51. In contrast, Thrasher et al. focus on a method of generating alternatives to words indicative of recognized speech. They address the problem of correction of recognized text. Where the ASR module had provided text from the speech, and the user often identified various words or phrases in the text for correction, Thrasher et al. identified that during this correction process, the system could present alternative words for recognition for each word the user desires to correct. For large dictations, it becomes cumbersome to maintain all the possible alternatives for each possible word to be corrected. Therefore, their invention focuses on a method of generating alternatives to words indicative of recognized speech to help in the text correction of speech. Necessarily, as part of their invention, the user must select a portion of the recognized speech for correction. Paragraphs 0005 - 0007.

The fact that Thrasher et al. teach that a user will select text for correction is instructive. In that context, where a user is dictating a document, reviewing text, and then correcting text, it is implied that there is a single user application rather than a multiple user application. Often, in these applications for dictation and correction of text, the single user trains the system on their voice so that accuracy is statistically high. Digalakis et al.'s context

is an adaptive approach to improving recognition for various speakers. There is less of an opportunity in the context of various speakers where one of the individual speakers will then receive the text in the context of dictation of a large document as identified by Thrasher et al. and sit down to perform correction on selected portions of the text. As noted by Digalakis et al., their invention seeks to "quickly" adapt to a particular speaker using a small amount of adaptation data. Col. 2, lines 50-51. The suggestion to one of skill in the art for a system where a user carefully dictates a document and then reviews the text for correction as is the context of Thrasher et al. is not one of a multi-speaker environment where the recognition model should be fashioned to quickly adapt to new speakers.

Therefore, although both Digalakis et al. and Thrasher et al. relate generally to speech recognition, Applicants submit that there is no suggestion or motivation to combine the multi-speaker quick adaptation approach of Digalakis et al. with the method of generating alternatives word words in recognized speech selected by the user in Thrasher et al. For this reason, Applicants submit that these references should not be combined and that claims 2, 6 - 7, 9, 11 and 16 are patentable and in condition for allowance.

The Examiner rejects claims 3 - 4 as being unpatentable in view of Digalakis et al., Thrasher et al. and further in view of U.S. Patent No. 712,957 to Waibel et la. ("Waibel et al."). Applicants submit that these claims are patentable since the parent claim 1 is patentable and since there is no motivation or suggestion to combine Digalakis et al. with Thrasher et al. Therefore, withdrawal of this rejection is requested.

The Examiner rejects claim 5 as being unpatentable over Digalakis et la. in view of U.S. Patent No. 6,243,679 to Mohri et al. ("Mohri et al."). Applicants traverse this rejection and submit that claim 5 is patentable because under 35 U.S.C. Section 103(c), Morhi et al. cannot preclude patentability. Mohri et al. qualifies for two reasons: (1) Morhi et al. is section 102(e) prior art where it is a patent that was granted on an application for patent by another filed in the U.S. before the invention by Applicants; and (2) Morhi et al. is assigned

to AT&T Corp. and the present application is assigned to AT&T Corp. Therefore, at the time the present invention was made, the present invention and the Mohri et al. reference were owned by the same person or subject to an obligation of assignment to the same person. Therefore, Applicants submit that claim 5 is patentable over these references since Mohri et al. cannot preclude patentability of this claim.

The Examiner rejects claim 10 as being unpatentable in view of Digalakis et al. and U.S. Patent No. 6,304,844 to Pan et al. Applicants submit that since claim 10 depends from claim 8, which as has been shown above to be patentable, that claim 10 is also patentable and in condition for allowance.

The Examiner also rejects claim 15 in view of Digalakis et al. and Waibel et al. Claim 15 depends from claim 14 which above has been shown to be patentable. Accordingly, Applicants submit that claim 15 is patentable over these references as well.

CONCLUSION

Having addressed the rejection of claims 1 - 16, Applicants respectfully submit that the subject application is in condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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